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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/797,422	03/10/2004	John Frederick Ackerman	122802-3	4370
31838	7590	01/19/2005	EXAMINER	
HASSE GUTTAG & NESBITT LLC 7550 CENTRAL PARK BLVD. MASON, OH 45040			TUROCY, DAVID P	
			ART UNIT	PAPER NUMBER
			1762	

DATE MAILED: 01/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/797,422

Applicant(s)

ACKERMAN ET AL.

Examiner

David Turocy

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on filing 3/10/2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 17-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 17-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>5/26/04, 3/10/04</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Oath/Declaration

1. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:

- a. The oath does not properly identify the U.S. parent application to which the present application claims benefit.

Drawings

2. The drawings are objected to because the drawings submitted on 3/10/2004 do not have proper identification numbers i.e. Figure 1. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as

per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 17-25 and 27-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 5324544 by Spence et al. ("Spence") in view of US Patent 5871820 by Hasz et al. ("Hasz").

Claims 17-18, 23 and 31: Spence teaches of a method for protecting a metal gas turbine component from environmental contaminants using an alumina-silica coating (abstract). Spence discloses application of the mixed oxide coating to various substrates, including ceramics and metal alloys (Column 4, lines 27-42). Spence discloses providing an alumina precursor that will yield an aluminum oxide upon deposition to a substrate and a subsequent heat treatment from 1200 °F to 1500°F for complete curing of the coating (Column 4, lines 23-26, Claim 12).

Claims 19-22: Spence discloses using organo-metallic compounds, such as aluminum alkoxides, for example aluminum sec-butoxides, ethoxides, and methoxides (Column 5, lines 11-17). Spence discloses using a sol comprising 78.3 parts methyl alcohol, 4.4 parts silica sol, and 17.3 parts aluminum sec-butoxide (Column 8 line 69 – Column 9 line 2). Spence discloses immersing a substrate in a sol and then firing for 5 hours at 1112 °F (Column 8, lines 58-64).

Claims 27-28: Spence discloses using an aqueous compositing including a solution of water and an organic solvent, such as organic alcohols, aldehydes, and ketones (Column 5, lines 21-29).

Spence fails to teach protecting a thermal barrier coating comprising a non-alumina ceramic layer and a bond coat layer.

Hasz, teaching of a method for protecting a thermal barrier coating from environmental contaminants, discloses providing a metal substrate with a thermal

Art Unit: 1762

barrier coating consisting a ceramic layer, frequently yttria-stabalized zirconia, on a bond coat (Abstract, Column 1, lines 19-56). Hasz further teaches a protective layer is needed on thermal barrier coatings because they are susceptible to various modes of damage from environmental contaminants (Column 1, lines 45-56). Hasz discloses using a dense impermeable barrier comprising metal oxides such as alumina (Column 2, lines 28-31, Column 3, lines 46-50). Hasz discloses depositing the impermeable barrier by coating methods known in the art such as sol-gel, sputtering, air plasma spray, etc. (Column 4, lines 25-30).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Spence to use the protective coating on a thermal barrier coating suggested by Hasz to provide a desirable protection from environmental contaminants because Spence teaches applying an alumina/silicon coating protects various substrates, including ceramic, from contaminants and Hasz teaches thermal barrier coatings, with outer layers of ceramic, benefit from a contaminant protective coating.

Claims 24 and 25: Spence in view of Hasz fails to disclose heating the aluminum alkoxide to a temperature or 1200 to 1500°F for at least 4 hours. However, Spence discloses immersing a substrate in a sol and then firing for 5 hours at 1112 °F (Column 8, lines 58-64). Spence also discloses a heat treatment from 1200 °F to 1500°F for complete curing of the coating (Claim 12). Therefore it is the examiners position that the length of time for a heat treatment is a result effective variable, as not enough time would not provide properly cure the coating providing the desired protective properties

and too much time would not off additional benefits of more protection against environmental contaminants.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to determine the optimal heat treatment time, in the process of Spence in view of Hasz, through routine experimentation, to provide the desired protective layer on a thermal barrier coating. It is well settled that determination of optimum values of these process parameters is within the skill of one practicing in the art. See *In re Boesch*, 205 USPQ 215 (CCPA 1980).

Claims 29 and 30: Spence in view of Hasz fails to disclose treating the outer layer for a period of time from 1 to 5 minutes. However, Hasz discloses the importance of determining the appropriate coating thickness, where thick and thin coatings are possible (Column 4, lines 25-36). Therefore it is the examiners position that the length of treatment is a result effective variable, as not enough time would provide a less than desired coating thickness resulting in poor protective properties and too much time would provide a coating thickness which does not offer additional benefit of more protection.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to determine the optimal treatment time, in the process of Spence in view of Hasz, through routine experimentation, to provide the desired protective coating thickness onto the thermal barrier coating. It is well settled that determination of

Art Unit: 1762

optimum values of these process parameters is within the skill of one practicing in the art. See *In re Boesch*, 205 USPQ 215 (CCPA 1980).

6. Claims 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 5324544 by Spence et al. ("Spence") in view of US Patent 5871820 by Hasz et al. ("Hasz") and further in view of Ceramics and Glasses.

Spence in view of Hasz teach all the limitations of this claim, except they fail to explicitly disclose thermally converting the aluminum alkoxide to alpha alumina.

However, Ceramics and Glasses, discloses Al_2O_3 , also known as alumina, is produced by heating hydrates of alumina through transitional structures to its final form, where all the transitional structures are transformed irreversibly to $\alpha\text{-Al}_2\text{O}_3$, the only stable form at high temperatures (Page 752).

Therefore, it is the examiners position that the thermal treatment of Spence in view of Hasz inherently converts the aluminum alkoxide to an alpha alumina because it is disclosed by Ceramics and Glasses that alpha alumina results from thermal treatment of all aluminum hydrates.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent 5683825 by Bruce et al discloses applying an alumina coating on a non-alumina thermal barrier coating by various vapor deposition

Art Unit: 1762

processes. US Patent 6156439 by Coffinberry discloses coating to prevent adherence of environmental contaminants at high temperatures.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Turocy whose telephone number is (571) 272-2940. The examiner can normally be reached on Monday-Friday 8:30-6:00, No 2nd Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


David Turocy
AU 1762


FRED J. PARKER
PRIMARY EXAMINER